

Perihelion passage, 1879, October 4<sup>h</sup> 28<sup>m</sup> 7<sup>s</sup> G.M.T.

Longitude of perihelion ...	201° 41' 52".8	{ Apparent Eq. August 31.
ascending node ...	86° 54' 4".2	
Inclination ...	76° 57' 38".2	
Log. perihelion distance ...	0.9983406	

Motion—direct.

Positions deduced from these elements for midnight at Greenwich are:—

	Right Ascension. h. m.	Declination North.	Log. distance from Earth.	Log. distance from Sun.
Oct. 2 ...	14 19.1	22 31	0.2044	9.9985
3 ...	23.5	21 30		
4 ...	27.9	20 30	0.2072	9.9985
5 ...	32.1	19 29		
6 ...	36.3	18 28	0.2106	9.9987
7 ...	40.4	17 28		
8 ...	44.4	16 27	0.2144	9.9995
9 ...	48.3	15 27		
10 ...	52.2	14 28	0.2187	0.0008
11 ...	55.9	13 28		
12 ...	14 59.6	12 30	0.2234	0.0027

On November 4.5 the right ascension is 242° 40' and the declination 7° 6' south, the comet setting in London two and a quarter hours after the sun; the intensity of light is then somewhat greater than at discovery, so that observations may be expected till about a month after the perihelion passage.

#### NEAR APPROACH OF COMETS TO THE EARTH.—

Amongst the cases of close approach of comets to our globe there are two in which we are able to fix the actual degree of approximation with certainty, the orbits at the times having been determined with great precision. The first is that of the comet of 1770, treated of by Laplace in the *Mécanique Céleste*. According to Clausen's elaborate investigation, in which the effect of the earth's attraction is included, this comet at 5h. 6m. P.M. Greenwich time on July 1, was distant only 0.01509 of the earth's mean distance from the sun, or 1,390,000 miles, and it is the closest approach of one of these bodies of which we have any certain knowledge. On this evening its apparent diameter, as measured by Messier, was no less than  $2\frac{1}{2}$ , or nearly five times the apparent diameter of the moon; at this time the comet was traversing the constellation Draco. The second case is that of Biela's comet at its appearance in 1805. At 9h. P.M. on December 9, just before it descended below the horizon in Europe, and almost at the time of the last observation by Thulis at Marseilles, the comet was distant 0.0366, or about 3,380,000 miles. There can be little doubt that the comets of 568, 1366, 1472, and others passed near the earth, but the elements of their orbits are not determinable within anything like close limits. The first comet of 1743, for which Clausen assigned an elliptical object, was also near to us, but the orbit in this instance is doubtful, and the actual distance in perigee cannot be deduced with precision.

There have been many instances where comets at one or other node have passed much nearer to the earth's orbit even than in the case of the comet of 1770, as occurred with Biela's comet in 1839, but the nodal passages have taken place when the earth has been far removed from these points of her path.

#### BIOLOGICAL NOTES

THE "CHALLENGER" RHIZOPODS.—In the current number of the *Quarterly Journal of Microscopical Science* Mr. H. B. Brady, F.R.S., continues his very interesting preliminary report on the porcellaneous and hyaline types of rhizopods met with in the dredged stuff brought home by the *Challenger* Expedition. He very justly abolishes the misleading generic names of *Tri-* and *Quinque-loculina*, agreeing with Prof. Williamson to employ the modified term *Miliolina* for the section. Quoting *Decaissella*,

M-Chalmas, as a synonym of *Dactylopora*, P. and J., he mentions that *D. eruca* occurs in considerable variety of form, but that after the examination of a large number of fresh specimens, he has never seen anything to correspond to the structures figured in M-Chalmas's paper in the *Comptes Rendus*—figures curiously enough reproduced in another portion of the same journal, in which Mr. Brady's paper appears. The species of *Lagena* found supply material, we are told, for five or six crowded plates, its varieties embracing modifications of contour and surface decoration before unknown and most remarkable for their individual beauty. The rare and interesting *Pavonina flabelliformis*, D'Orbig., has been taken at three of the *Challenger* stations; originally described imperfectly by D'Orbigny from a specimen from Madagascar in 1826, it remained unknown until dredged by Dr. E. Perceval Wright in shallow water near the Seychelles. Two excellent figures of it are given. A number of forms of *Globigerina* are described. *Hastigerina*, Wy. T., is referred to *Nonionina*, D'Orbig. The paper closes with some notes on "Pelagic Foraminifera," in which, "while without departing from an attitude of caution in accepting evidence upon a subject so beset with difficulties," the author confesses that he sees no anomaly in the supposition that organisms so simply constituted as this group of protozoa may be equally at home at the surface and at the bottom of the ocean.

THE "CHALLENGER" ECHINI.—Prof. Alexandér Agassiz has just published a preliminary report on the echini of the exploring expedition of H.M.S. *Challenger* in the *Proceedings of the American Academy* (vol. xiv. p. 190, June, 1879). It was not Agassiz's intention to publish this preliminary notice, as he hoped to be able to issue the descriptions of the species with his final report on the group; he found himself, however, compelled for the sake of retaining for the material of the *Challenger* expedition the priority of discovery, to notice, however briefly, the magnificent collection of sea-urchins intrusted to his care by Sir Wyville Thomson. In contrasting this collection with those made during the two expeditions of the U.S. steamer *Blake*, Agassiz says that these latter contain some of the most interesting forms obtained by the former, often complementing more or less imperfect *Challenger* material. Among the Cidaridæ, Arbaciadæ, and Diadematidæ, many new species were found, and a new genus allied to *Astropyga*. Among the Echinuridæ, a number of new species were dredged. Among the Echinometradæ nothing of importance was collected. Among the Temnopleuridæ excellent series of the species of *Salmacis* and *Temnopleurus* were obtained, a *Cottaldia*, hitherto only known from the chalk, and an exquisite genus *Prionechinus*, allied to *Salmacis*. The most interesting feature of the Echinidæ proper, was the occurrence of several northern forms in deep water in the tropics. Not a single new species of Clypeastroids was found, and the number of specimens even was quite small. They do not play any important part in shaping the character of the fauna of deep water, and are, perhaps, the most strictly littoral group of Echini, indicative at least, in the present epoch of comparatively shallow water, inside of the 100-fathom line, and probably giving us a good guide as to the depth of the sea and the nature of the bottom of the cretaceous and tertiary shores, where they occur in such large numbers. One recent species of *Catopygus* is interesting, as adding another of the cretaceous forms to those still living. By far the most interesting group of Echini is that of the Pourtalesidæ—the species were found in abundance; of *Pourtalesia* there are six species. In *Cystechinus* there are three species, *C. Wyvillii* and *C. clypeatus* have quite stout tests, while in *C. vesica* the test is reduced to a mere film, so that even in alcohol the shape of this sea urchin reminds one of the crown of an old felt hat which had seen its best days. The test of all the *Pourtalesidæ* is quite delicate, the amount of lime-

stone being, at the great depths where they occur, reduced to a minimum, and yet even at the greatest depths they are found associated with Ophiurans, which are by no means wanting in lime. Among the Euspatangia, *Spatangus purpureus* occurred in the tropics at a depth of 400 fathoms, and *Echinocardium australe* was dredged at the great depth of 2,675 fathoms. In Australia it is a littoral zone species. Among the Brissina two species of *Hemiaster* were obtained allied to *H. prunella*, a new species of *Rhinobrissus*, and two new ones of *Schizaster*. No better idea can be given of the value of this extraordinary collection than by stating that there are described in this list no less than forty-four new species. At the time of the publication of Agassiz's "Revision of the Echini," there were scarcely over two hundred species of Echini known, and since that time less than fifty species have been added to the list. In the specific diagnosis of the species only the principal localities are given; the full details are reserved for the full report, which we believe is in good progress, many of the requisite illustrations being already engraved.

ATLANTIC STALK-EYED CRUSTACEANS.—Mr. S. J. Smith, of Yale College, publishes, in the *Transactions of the Connecticut Academy of Arts and Sciences* (vol. v. part 1), an account of the stalk-eyed crustaceans of the Atlantic Coast of North America. This account forms part of the report in preparation for the United States Commissioner of Fisheries. It embodies the study of the extensive collections made during the past fourteen years by Prof. Verrill and himself. In the present paper only the species inhabiting the coast between Cape Cod and Northern Labrador are given, and although the paper has special reference to the geographical distribution of the species, considerable matter is introduced in regard to specific variation and specific characters, and under some of the species, to the synonymy, especially where it seemed necessary to the proper understanding of the geographical distribution, or to show the propriety of the nomenclature adopted, or where the species is not well known. The total number of species recorded is 73, of which 45 are Decapods, 11 Schizopods, and 17 Cumaceæ, one-half of which are also to be found in Europe, the author concluding that there is not only a close relationship between the marine fauna of Greenland and that of Northern Europe, but a similar close one between that of Greenland and of the coasts of the continent of North America.

LAND-SHELLS OF CALIFORNIAN AND MEXICAN ISLANDS.—In a short paper in *Proc. Acad. Nat. Sci. of Philadelphia* for 1879 (p. 16), Mr. W. G. Binney gives an important contribution to the geographical distribution of land-shells. The Mexican island of Guadalupe, 220 miles from San Diego, off the west coast of Lower California, has been visited by Dr. E. Palmer, and he found numerous fragments of snail-shells which had been devoured by a species of mouse, the only land mammal on the island. These appeared to belong to *Arionta rowelli* (Newcomb), found in Lower California. *A. facta* occurred, a variety with open umbilicus, like that found fossil on San Nicolas Island, California. Living specimens of *Binneya notabilis* were brought from Guadalupe, found also on the Californian island of Santa Barbara; it is very nearly allied to if not synonymous with the Mexican genus *Xanthyx*. Thus it is supposed to have been first distributed from Mexico, then to Guadalupe, thence to Santa Barbara.

NEW GENUS OF FISHES APPROXIMATING TO THE MACKEREL.—In the San Francisco market a fish is often exposed for sale, having a long body, with more than seven finlets behind dorsal and anal fins, the body having long narrow scales on region behind the eye, on each side of the dorsal outline, and on base of tail; the rest of the body is bare of scales. It has no corselet, and no teeth

on vomer or palatines. There are fifteen dorsal spines, very fragile and slender. The ventral fins are very small, the colour is dark steel blue above, silvery below; and there are no streaks. The length of a specimen described by Mr. Lockington (*Proc. Acad. Nat. Sci. Philadelphia*, 1879, p. 136) was 21 inches to end of middle rays of caudal, length of head  $4\frac{1}{4}$  inches, greatest depth of body  $4\frac{1}{2}$  inches, length of pectoral fins  $2\frac{3}{8}$  inches, ventrals 1 inch.

HAIR-WORMS.—Curious knotted masses of hair-worms (*Gordius*) are sometimes found in gutters after rain. Prof. Leidy disentangled one such mass last winter, containing fifty-two males and seven females; the former were from 8 to 25 centimetres long, and from one-half to two-thirds of a millimetre in thickness; the latter from 14 to about 20 centimetres long and 1 millimetre thick. These worms are very lively; and when disentangled soon become again aggregated with the heads external and divergent.

PROF. MARSH, when examining recently the Rocky Mountain deposits known as the *Atlantosaurus* Beds, was rewarded by the discovery of the lower jaw of a mammal, a diminutive marsupial (somewhat smaller than a weasel), differing widely from any living type. The remarkable feature in the jaw is the series of premolar and molar teeth. The nearest affinities of this mammal are with the genus *Stylodon*, of Owen, from the Purbeck beds of England. Prof. Marsh designates the new genus *Stylacodon*, and the species represented *S. gracilis*.

#### GEOGRAPHICAL NOTES

AT the meetings of the International Geodetic Association at Geneva the representatives of the various countries present reported on the works executed by their governments. We are pleased to learn of a resolution of the French Ministry to proceed to a new levelling of precision of the first order on a length of 17,000 kilometres; a levelling of the second order will follow on a length of 800,000 kilometres. The operations to connect Spain and Algeria, to which we have referred were also described. The next meeting will be held at Munich in the autumn of 1880.

A TELEGRAM from Samarkand to the Russian papers, informs us that the expedition for the tracing of a railway from Karaturghel to Tashkend and Samarkand has finished its explorations. It has explored the banks of the Syr-daria in the neighbourhoods of Kara-Uzyak, the coal-mines at Khojent, and the moving sands of Fergana, as well as a part of the Surkhan river and the roads from Samarkand through Djam-Karshee and Kitab-Shaar to the Iron Gate, and thence to the ruins of Termez on the Amu-daria. Throughout its route the expedition has made astronomical, meteorological, geological, botanical, and zoological researches; now it is engaged in a hydrographical description of the Amu-daria and of its delta.

THE Russian Government are actively pursuing the exploration of the great rivers of Russia in Europe. Thus, during the last three years the Volga was surveyed on a length of 775 miles; a thorough levelling is completed on 300 miles, and no less than 91,720 soundings give the necessary data for preparing a detailed map of the river. The Chussovaya river, one of the upper branches of the Kama river, has been explored on 270 miles, and the Byelaya, the other branch, on 160 miles. The Vyatka river is thoroughly surveyed and levelled. The description of the Vistula is quite completed. Extensive surveys and levellings were made on the river systems of the Dneiper and Bug, as well as on the Don, which is surveyed on a length of 560 miles. New surveys were undertaken last year on the Northern Drina and Sukhona, as well as in the basins of the Obi and Yenissei. Several stations were established for